Eric Schulz

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Employment History

since 2017 **Data Science Postdoctoral Fellow.** Harvard University, Computational Cognitive Neuroscience Lab (PI: Prof. Samuel Gershman), Cambridge, USA.

2013 **Volunteer.** Uganda Virus Research Institute, Entebbe, Uganda.

2012 – 2013 **Machine Leaning Analyst.** Zalando, Berlin, Germany.

2008 – 2010 **Student Research Assistant.** Center for Adaptive Behavior and Cognition, Max Planck Institute for Human Development, Berlin, Germany.

Education

2014 – 2017 **PhD Experimental Psychology.** University College London (Supervisor: Dr. Maarten Speekenbrink), London, UK.

2013 – 2014 **M.Res. Computer Science.** University College London (Supervisor: Dr. Maarten Speekenbrink), London, UK.

2011 – 2012 **MSc Applied Statistics.**, University of Oxford (Supervisor: Prof. Brian Ripley), Oxford, UK.

2010 – 2011 **MSc Cognitive and Decision Sciences.**, University College London (Supervisor: Prof. David Shanks), London, UK.

2007 – 2010 **BSc (Vordiplom) Psychology.** Humboldt University, Berlin, Germany.

Research Publications

Journal Articles

1. Parpart, P., Schulz, E., Speekenbrink, M., & Love, B. C. (submitted). Active learning reveals underlying decision strategies.
2. Quiroga, F., Schulz, E., Speekenbrink, M., & Harvey, N. (submitted). Structured priors in human forecasting.
3. Schulz, E. (submitted). Compositional theories of intelligence.
4. Schulz, E. & Gershman, S. J. (submitted). The algorithmic architecture of human exploration in the brain.
5. Schulz, E., Wu, C. M., Ruggeri, A., & Meder, B. (submitted). Searching for rewards like a child means less generalization and more directed exploration.
6. Wu, C. M., Schulz, E., Speekenbrink, M., Nelson, J. D., & Meder, B. (submitted). Exploration and generalization in vast spaces.
7. Dasgupta, I., Schulz, E., Goodman, N. D., & Gershman, S. J. (2018). Remembrance of inferences past: Amortization in human hypothesis generation. *Cognition*, *178*, 67–81.
8. Schulz, E., Speekenbrink, M., & Krause, A. (2018). A tutorial on Gaussian process regression: Modelling, exploring, and exploiting functions. *Journal of Mathematical Psychology*, *85*, 1–16.
9. Schulz, E., Wu, C. M., Huys, Q. J. M., Krause, A., & Speekenbrink, M. (2018). Generalization and search in risky environments. *Cognitive Science*. doi:10.1101/227322

10. Dasgupta, I., Schulz, E., & Gershman, S. J. (2017). Where do hypotheses come from? *Cognitive Psychology*, *96*, 1–25.
11. Schulz, E., Konstantinidis, E., & Speekenbrink, M. (2017). Putting bandits into context: how function learning supports decision making. *Journal of Experimental Psychology: Learning, Memory, and Cognition*.
12. Schulz, E., Tenenbaum, J. B., Duvenaud, D., Speekenbrink, M., & Gershman, S. J. (2017). Compositional inductive biases in function learning. *Cognitive Psychology*, *99*, 44–79.
13. Cokely, E. T., Galesic, M., Schulz, E., Ghazal, S., & Garcia-Retamero, R. (2012). Measuring risk literacy: the berlin numeracy test. *Judgment and Decision Making*, *7*(1), 25.
14. Cokely, E. T., Ghazal, S., Galesic, M., Garcia-Retamero, R., & Schulz, E. (2012). How to measure risk comprehension in educated samples. *Transparent Communication of Health Risks*, 29–52.
15. Schulz, E., Cokely, E. T., & Feltz, A. (2011). Persistent bias in expert judgments about free will and moral responsibility: a test of the expertise defense. *Consciousness and Cognition*, *20*(4), 1722–1731.

Conference Proceedings

1. Dasgupta, I., Schulz, E., Smith, K. A., Tenenbaum, J. B., & Gershman, S. J. (2018). Learning to act by integrating mental simulations and physical experiments. In *Proceedings of the Fortieth Annual Conference of the Cognitive Science Society*.
2. Jones, A., Schulz, E., Meder, B., & Ruggeri, A. (2018). Active function learning. In *Proceedings of the Fortieth Annual Conference of the Cognitive Science Society*.
3. Krusche, M., Schulz, E., Guez, A., & Speekenbrink, M. (2018). Adaptive planning in human search. In *Proceedings of the Fortieth Annual Conference of the Cognitive Science Society*.
4. Rule, J., Schulz, E., Piantadosi, S. P., & Tenebaum, J. B. (2018). Learning list concepts through program induction. In *Proceedings of the Fortieth Annual Conference of the Cognitive Science Society*.
5. Wu, C. M., Schulz, E., Garvert, M. M., Meder, B., & Schuck, N. W. (2018). Connecting conceptual and spatial search via a model of generalization. In *Proceedings of the Fortieth Annual Conference of the Cognitive Science Society*.
6. Dasgupta, I., Schulz, E., Goodman, N. D., & Gershman, S. J. (2017). Amortized hypothesis generation. In *Proceedings of the Thirty-Ninth Annual Conference of the Cognitive Science Society*.
7. Schulz, E., Klenske, E., Bramley, N. R., & Speekenbrink, M. (2017). Strategic exploration in human adaptive control. In *Proceedings of the Thirty-Ninth Annual Conference of the Cognitive Science Society*.
8. Wu, C. M., Schulz, E., Speekenbrink, M., Nelson, J. D., & Meder, B. (2017). Mapping the unknown: The spatially correlated multi-armed bandit. In *Proceedings of the Thirty-Ninth Annual Conference of the Cognitive Science Society*.
9. Schulz, E., Huys, Q. J., Bach, D. R., Speekenbrink, M., & Krause, A. (2016). Better safe than sorry: Risky function exploitation through safe optimization. In *Proceedings of the Thirty-Eighth Annual Conference of the Cognitive Science Society*.
10. Schulz, E., Speekenbrink, M., Hernández-Lobato, J. M., Ghahramani, Z., & Gershman, S. J. (2016). Quantifying mismatch in bayesian optimization. In *NIPS Bayesian Optimization workshop*.

11. Schulz, E., Speekenbrink, M., & Meder, B. (2016). Simple trees in complex forests: Growing Take The Best by Approximate Bayesian Computation. In *Proceedings of the Thirty-Eighth Annual Conference of the Cognitive Science Society*.

12. Schulz, E., Tenenbaum, J. B., Duvenaud, D., Speekenbrink, M., & Gershman, S. J. (2016). Probing the compositionality of intuitive functions. In *Advances in Neural Information Processing Systems*.

13. Parpart, P., Schulz, E., Speekenbrink, M., & Love, B. C. (2015). Active learning as a means to distinguish among prominent decision strategies. In *Proceedings of the Thirty-Seventh Annual Conference of the Cognitive Science Society*.

14. Schulz, E., Konstantinidis, E., & Speekenbrink, M. (2015). Exploration-exploitation in a contextual multi-armed bandit task. In *International Conference on Cognitive Modeling* (pp. 118–123).

15. Schulz, E., Konstantinidis, E., & & Speekenbrink, M. (2015). Learning and decisions in contextual multi-armed bandit tasks. In *Proceedings of the Thirty-Seventh Annual Conference of the Cognitive Science Society*.

16. Schulz, E., Tenenbaum, J. B., Reshef, D. N., Speekenbrink, M., & Gershman, S. J. (2015). Assessing the perceived predictability of functions. In *Proceedings of the Thirty-Seventh Annual Conference of the Cognitive Science Society*.

17. Schulz, E., Speekenbrink, M., & Shanks, D. R. (2014). Predict choice – a comparison of 21 mathematical models. In *Proceedings of the Thirty-Sixth Annual Conference of the Cognitive Science Society*.

Awards and Scholarships

Awards

2018 **Robert J. Glushko Award** for Outstanding Doctoral Dissertation in Cognitive Science.

2016 **EPS Grindley Award** to attend the International Conference of Thinking.

SLMS Graduate School Conference Fund to attend the Annual Meeting of the Cognitive Science Society.

2015 **UCL Sully Award** for best PhD upgrade talk in the Department of Cognitive, Perceptual, and Brain Sciences.

Cognitive Science Travel Award for top 20 student papers at the the Annual Meeting of the Cognitive Science Society.

Scholarships

2017 **Harvard Data Science Postdoctoral Fellowship**.

2016 **UCL Bogue Research Fellowship** funding 3 month visit to Harvard (Prof. Samuel Gershman) and MIT (Prof. Joshua Tenenbaum).

2013 **ESPRC scholarship** funding both MRes and PhD at UCL by the Centre for Doctoral Training in Financial Computing and Analytics.

2011 **Haniel scholarship** funding MSc at the University of Oxford.

2010 **DAAD scholarship** funding MSc at University College London.

Research Visits

2017 **Max Planck Institute for Human Development.** Visiting Dr. Jonathan Nelson and Dr. Björn Meder for 3 months.

Research Visits (continued)

2016 **Harvard/MIT.** Visiting Prof. Samuel Gershman (Harvard) and Prof. Joshua Tenenbaum (MIT) for 3 months.

2015 **ETH Zurich.** Visiting Prof. Andreas Krause for 3 months.

Invited Talks

2018 **Ecole Normale Supérieure.** Workshop organized by Stefano Palminteri.

Cognitive Science Conference. Symposium for Glushko award winners.

2017 **ConCats seminar series.** New York University.

CBB Lunch. Harvard University.

Cognitive Psychology Colloquium. University of Göttingen.

Cognitive Science Colloquium. University of Onsabrück.

2016 **London Judgement and Decision Making Seminar.** University College London.

Gershman Lab Meeting. Harvard University.

Coffee and Tea Talk. Max Planck Institute for Human Development.

2015 **Psychology Seminar Series .** City University.

Krause Lab Meeting . ETH Zürich.

Oberauer Lab Meeting . University of Zürich.

Economic Psychology Colloquium . University of Basel.

2014 **Workshop on Optimal Experimental Design.** Invited Speaker.

Supervision

Graduate Student Projects

2018 **Charley Wu**. Exploration and Generalization in Vast Spaces.

Angela Jones. Active Function Learning.

2017a **Ishita Dasgupta**. Amortized Hypothesis Generation.

Pablo Villagra. One-shot Compositional Function Learning.

Master Student Dissertations

2017b **Francico Quiroga**. Structured Priors in Human Forecasting.

Mortiz Krusche. Adaptive Planning in Human Search.

Yee Siang Chng. The Effects of Function Change in Spatially Correlated Bandits.

2015 **Christoph Niemeyer**. Active Sampling as Sequential Bayesian Quadrature.

Bachelor Student Dissertations

2016 **James Chu**. Safe Exploration in Reinforcement Learning.

Ryan Tan. Framing Effects in Multi-armed Bandits.

Teaching Experience

2014-2017 **Teaching assistant.** PSYCGR01: Statistics for graduate students.

Ad-hoc lecturer. PSYCGD04: Knowledge, Learning and Inference.

2015 **Teaching assistant.** COMPG011: Data Analytics using R.

Skills

Languages	German (native), English (fluent), Russian (basic), French (basic).
Coding	Python, R, Matlab, Julia SQL, XML/XSL, LaTeX, Haskell, C++.
Web Dev	HTML, CSS, JavaScript, github, MTurk.

Professional Service

since 2012 **Reviewer.** Psychonomic Bulletin and Review, Journal of Experimental Psychology: General, Journal of Cognitive Neuroscience, Neural Information Processing and Systems, Cognitive Science Society, PLOS: Computational Biology, Journal of Experimental Psychology: Learning, Memory, and Cognition, Journal of Mathematical Psychology.

2018 **Wokshop organizer.** Learning as program induction (jointly with Neil Bramley). Workshop at the Annual Meeting of the Cognitive Science Society.

2015-2017 **Seminar organizer.** London Judgement and Decision Making seminar series.

References

Prof. Samuel Gershman
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Dr. Maarten Speekenbrink
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Prof. Joshua Tenenbaum
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jbt@mit.edu